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ICSG Information Circular

How are e-Marketplaces Changing the Copper Industry Supply Chain Infrastructure?

November 2000

Notice: The information contained in this document is intended to provide an overview of the current situation in e-markets, as it affects the copper industry. This paper is provided for reference purposes only. References to sites, companies, and agencies are for information purposes only.

How are e-Marketplaces Changing the Copper Industry Supply Chain Infrastructure?

1. Background

ICSG's objective is to increase copper market transparency and promote international discussions and cooperation on issues related to copper. The purpose of this info-circular is to pool information together to assist members to better understand the changing copper industry supply chain infrastructure. Much has happened in the metals sector within the last 6 months. There's been considerable recent activity building systems and Internet sites to address selling of copper and its downstream products, and buying supplies. Given most sites are in development or very young, it is too early to discern the resulting domino effect, if any, such as reallocation of market share predicted by Andersen Consulting. However, there is general consensus that there will be a flurry of consolidations, if not collapses, in e-marketplace ventures over the next year or two.

2. E-Marketplaces in General

E-marketplaces are websites where buyers and sellers come together to buy or sell products and services. E-marketplaces expand choices available to buyers, give sellers access to new customers, and reduce everyone's transaction costs. They are geared towards removing inefficiencies in the supply chain¹. More specifically:

The anticipated shared (both buyer and supplier) benefits are:

- improve market transparency by creating an open marketplace where rogue pricing is more difficult to hide.
- improve communication between trading partners.
- allow businesses to move beyond exchanging orders into more complex collaboration in design, fulfillment and coordination.

- The anticipated benefits for the buyers are:
 - allow procurement processes to be streamlined, paperwork reduced and costs saved.
 - let buyers attract bids from a larger supplier base than they could handle manually and better track of the bidding process.
 - save time by allowing purchasing departments to instantly compare prices, terms and specifications for products from various suppliers.
 - enable better enforcement of corporate procurement policies and reduces unapproved purchases.
 - allow closer synchronization of supply chain with the aim of reducing inventory and shortening cycle times.

- The anticipated benefits for the suppliers are:
 - expand the market by aggregating demand from multiple buyers.
 - enable smaller suppliers to find customers in new geographic markets or industry sectors they could not reach cost-effectively using traditional means.

Many believe Internet's overall result will be deflationary, which therefore favors buyers. However, technology opens opportunities to those who can add new efficiency to the market, and in doing so retain some of the new found profit.

Goldman Sachs, the US investment bank expects B2B (business-to-business) procurement activity to enhance the gross domestic product by an eventual 5% (initial growth average of .25%/year over next 10 years) in main industrialized countries. It predicts that the economy will settle at a permanently higher level of output and inflation will remain unchanged. Other economists say B2B is still too embryonic for them to attempt a proper estimate of its macroeconomic impact.

¹ Refers to items addressed in Annex 1, Glossary/Background.

The Gartner Group's (highly reputable independent analysts) B2B E-Commerce Forecast by Region to 2004, puts North America ahead of the pack, followed by Europe, then Asia Pacific, Japan and then Latin America. Its Forecast by Industry has high technology leading, followed by automotive, then utilities, communications, office supplies, business publishing, and last metals.

Currently there are about 1500 electronic markets that have been launched or announced, with a total of about 240 industries to serve. A shakeout is anticipated to occur within the next 3 years, with the integration of most e-marketplaces happening in about 10 years.

The goal of most clients is to automate procurement processes to reduce cost of sales from a traditional 10-40% of revenues, to perhaps as little as 2%. Owens Corning North American, a fiberglass insulation manufacturer claims online auctions have lowered buy prices by 10%. Savings of .5-5% are probably more common. Commerce One claims cost savings to its clients of 15-20%, and a cut of 2 to 3 days off the buy cycle.

Revenue for marketplace providers is derived from a number of sources such as subscription fees, advertising, provision of special services, and transaction fees (varying from 0 to 4%), sales of data, and lead generation.

E-marketplaces are more likely to succeed in markets with high sales and distribution costs. International standards for products and few product attributes to describe, also make it easier to implement. Success is likely where goods and services can be easily specified and are currently traded in a constrained system.

The marketplace for packaged software to build B2B marketplaces is still immature, and early electronic marketplaces had to build their own software systems, which is very costly. For example Chemdex and PlasticsNet are reported to have spent \$50 m. Now packaged software is available that reduces the time to market, is easier to maintain and less dependent on recruiting the necessary skills, although it still requires considerable customization. Integration across systems is not easy. To undertake transactions companies must be willing to change procurement and sales processes. Consider trying to eliminate human intervention in just a single end-to-end transaction from order to payment. Companies struggle to integrate back-end systems, therefore very few transactions are actually taking place on-line.

Furthermore consultants advise that the benefits of using e-commerce increase in direct proportion to the degree of integration between the customer and the marketplace. This is because integration increases both the efficiency and power of the business processes that can be carried out across the marketplace. However, there are substantial challenges involved integrating through the network of many systems.

In addition to the technical issues, organizations must address business issues. According to EDS, the systems integrator, the biggest hurdle is changing the buying habits and embedded processes with which all employees are accustomed. EDS claims that it is actually change management on a people and business process level that is the biggest challenge.

For companies who do not wish to build their own systems, they can start by using an application hosted by an e-marketplace. This allows them to procure or offer goods or services from their desktop computers using standard browser software. However, this may be inefficient because it requires users to work with the exchange and enter information manually both into the marketplace system, and their own internal ones. The next stage is therefore to use an extensible mark-up language (XML¹) to allow internal systems at the customer and the marketplace to send machine-readable text messages to each other, saving the duplicated manual input. Every step leads to more integration.

2.1 Types of Mechanisms Used by e-Marketplaces

Both on-line catalogs and auctions are used by e-marketplaces:

² Refers to items addressed in Annex 2, Description of Individual Copper Industry e-Marketplaces

1) On-line catalogs. The functions they may include are smart store fronts, multiple product configurations possibilities, catalog search engines and build-up (delivery options, total delivered cost), real-time available-to-promise, ability to link several purchases together, customer care service, and comparative shopping tools such as third party performance ratings.

2) e-auctions. This is an efficient way to drive suppliers down to reserve prices. It tends to be used outside normal sales process, since the focus on price, will result in a decrease in quality or reliability over time. Auctions are not useful to create collaboration and strategic relationships, required to produce quality and added value. Auctions are attractive to dispose of excess stocks or obsolete machinery.

There are two standard types of auctions, traditional and reverse auctions. The traditional auction has many buyers to one seller, may include a reserve price (lowest price seller will accept), and bids are upwards. In a reverse auction, there are many suppliers, but just one buyer. The aim is to force suppliers to outbid each other downward in real time, resulting in the buyer obtaining the best possible price.

2.2 Software Solution Providers

Ariba and Commerce One started by selling electronic procurement systems. Both now also operate their own exchanges, as well as provide software to automate the procurement process within organizations. Commerce One is creating a network of 18 linked exchanges.

i2 Technologies is a Dallas-based leading supply chain planning software vendor.

Ariba and i2 have an alliance with IBM.

ORACLE, a long established database¹ and enterprise resource planning (ERP¹) applications vendor, has written its own software solution. It is making inroads into e-marketplaces (e.g. Quadrem²).

SAP, the German ERP vendor has an alliance with Commerce One.

3. Regulatory Issues

Many companies have admitted spending fortunes on legal advice to unravel regulation. The issues are broad and the rulebook for Internet trading is not yet complete. The issues can roughly be separated into three categories: Internet Regulation and Standards, Competition Policy, and Commodity/Financial Services Regulation.

3.1 Internet Regulation and Standards

Internet regulation falls under the purview of national governments.

If users are not confident that the Internet is secure, they will not use it for purchases, and e-marketplaces will fail. Users want assurance that their commercial and financial transactions will be kept confidential, and will not be subject to tampering. It is generally agreed that there is a need for more common rules and standards across the globe for Internet business in areas, such as, digital signatures, privacy, Internet crime and international fraud, security standards, and unencumbered use of cryptography.

Progress is being made technically, in standards, and regulations. For instance:

- Encryption¹ - Rijndael was announced by the US Government in late October 2000 as the replacement to the current DES (data encryption standard) standard used by the US

since 1977. The US intends to use it to protect their top-secret documents for the next 30 years. The new standard is expected to have a big influence on e-commerce, and its algorithm will be freely available.

- Digital Signatures¹ - On July 25, 2000 electronic signatures became binding under UK law, just a few weeks after a bill was passed in the US (binding date: October 1, 2000). In Dec. 1999, Brussels passed a directive requiring European Union states to endorse the technology by summer 2001.
- Harmonizing security standards - Security is only as strong as the weakness link in the network. The global nature of Internet means that there must be harmonized security standards. British standard BS7799 has been proposed as an international standard, with some European countries already signed-up.
- Rules of Home Country - A European directive which must be implemented by end of 2001 will allow Internet retailers to trade across Europe on the basis of rules in home country. This is leading to modification of some unique laws to facilitate e-business domestically.

3.2 Competition Policy

The European Commission, US Federal Trade Commission, and the German Cartel Office are keeping a watchful eye on B2B marketplace developments. There is concern that by concentrating procurement in a particular industry sector, the e-marketplaces will distort competition and squeeze out smaller companies.

The dividing line between collaboration and collusion is a narrow one. Companies that cross it because of B2B ventures face serious sanctions. The European and US competition authorities have the power to cancel proposed B2B's, and impose swinging fines, opening the door to court action by aggrieved third parties seeking damages.

In the US, a B2B marketplace is considered by the antitrust laws to be a "joint venture", or collaboration among competitors. Competitor collaboration is generally prohibited. However, if a joint venture is, on balance, pro-competitive, under certain circumstances the FTC and DOJ (US Department of Justice) will permit the joint venture to operate. In April 2000 they published "Antitrust Guidelines for Collaborations Among Competitors".

Covisint, an automobile exchange developed by five of the largest automobile manufacturers, was the first B2B venture to be reviewed by US Federal Trade Commission. It received a guarded green light in September 2000. The case was seen as a significant test of FTC's attitude to B2B's. FTC intends to look at each B2B on the basis of its particular structure, market circumstances, and rules.

In October 2000, just days after also receiving final regulatory approval from the German Cartel Office, Covisint moved from the planning stage to actual operation. If successful, the site may set the pace for entire industry.

There are no hard rules for what constitutes anticompetitive behavior outside of simple rules of thumb: if the exchanges raise prices or reduce output, they are illegal. There are two areas of potential concern by regulators, which anyone contemplating a B2B needs to consider:

1) risk that the sharing of information by competitors could lead to price fixing or other anticompetitive behavior. Therefore B2B's need a clear policy on information disclosure and internet security systems, such as firewalls, to prevent confidential information leaking back from the marketplace to its parent companies, e.g. production and sales figures.

2) restrictions set on who can take part or on what other exchanges the participants are allowed to join.

A US lawyer during the August 2000 e-Commerce and the Copper Industry Conference, sponsored by the Copper Development Association, advised that the following questions would be typical of an B2B Exchange evaluation:

- 1) Is it procompetitive?
- 2) Does the B2B Exchange have monopoly power?
- 3) Does it have Monopsony Power, i.e. purchasing monopoly power?
- 4) Does the B2B Exchange facilitate collusion?
- 5) Is Exchange accessible by qualified participants?
- 6) Is the Exchange over-inclusive to extent that it diminishes competition by excluding a segment of the market?

Some believe that the model for the future is probably a marketplace owned by the industry at large, and run at arm's length.

3.3 Commodity/Financial Services Regulation

Two of the authorities involved are UK Securities and Futures Authority (SFA)², and the US Commodity Futures Trading Commission (CFTC)².

Emetra's Derivatives e-Marketplace

Emetra's² derivative (futures² and options) platform will be regulated in the usual way under the UK Securities and Futures Authority, and the US Commodity Futures Trading Commission.

These regulators are concerned about the information technology capability of regulated firms and exchanges and the loss of confidence which system failure would bring, such as the initial failure of the London Stock Exchange system. Therefore, as well as the current regulations covering a company's financial backing, holding positions and compliance arrangements, Emetra advised that prior to the SFA approving a firm, it must be satisfied that the systems are robust and that there is an adequate disaster recovery plan. It also cautioned that the IT trading rulebook was not yet complete.

US Commodity Exchange Act

NYMEX advised that the US CFTC is recommending changes to the US Commodity Exchange Act to provide for different levels of regulation, depending on the product to be offered.

4. Metals Sector, and Non-ferrous Metals

4.1 Sell End of Supply Chain

4.1.1 Metal Industry e-Marketplaces

The \$1,000 bn global metals industry is one of the largest without a traditional centralized marketplace for the whole sector. According to Andersen Consulting, Global Metals Practice, there are about 70 electronic marketplaces addressing metal in existence or under construction. They say each of the three main sectors, i.e. steel, specialty metals, and non-ferrous metals, has a separate structure and therefore different opportunities for exchanges. The general metal industry characteristics are cyclical demand, heavy capital investment, long term relationships, long manufacturing lead times, complex scheduling rules, industry consolidation, global competition, beginning of the supply chain.

The market is dominated by the steel sector, which has annual sales of \$700 bn. Since it has a long and complex supply chain, and is highly fragmented, it was ripe for e-marketplace exploitation. The two most established steel industry e-marketplaces are E-Steel, and MetalSite.

The next biggest sector is the specialty metals market, with annual sales of \$200 bn, with aluminum comprising the largest segment. Their e-marketplaces include MetalSpectrum² (Atlanta, US), and Steelscreen² (Swedish-based).

Jim Southwood, President of Commodity Metals Management (CMM) of the US says three e-trading models have emerged:

- 1) Intranet trading within a closed community, e.g. Spectron² futures, an energy and commodity broker, which allows LME category one and two brokers to trade with each other on-line. It is enabling a growing number of cash-to-three month transactions across a range of LME metals.
- 2) single company website operating a bulletin board, posting prices for its products, open to all buyers, e.g. Enron², Koch Metals (allows client to trade instantly for each month out to 27 months.).
- 3) a mini-exchange (neutral platform) with as much value-added as can be managed, e.g. aluminium.com focused presently on non-LME grades of aluminum including scrap and refined products, recently adding semis and primary and secondary material.

4.1.2 Non-ferrous Metals e-Marketplaces

The non-ferrous metals market has annual sales of \$100 bn. Consultants have been busy analyzing its potential for e-marketplaces: 1) Emetra² in collaboration with McKinsey, the management consultants, recently completed a study, and as a result state that they believe there is an inefficiency of \$700-800 m/year in the global non-ferrous market, which can be addressed by the marketplace. In the physical market of concentrate, ores, primary metal and scrap this consists of high interaction costs, excess shipping costs, and sub-optimal prices to users, for a total of around \$600 m. In the derivatives market it consists of high interaction costs and sub-optimal prices to users, for a total of around \$260 m. 2) Andersen Consulting predicts that 40-60 % of metal production will be sold through Internet by 2005, reallocating market share and margins between producers, outside warehouses and service centres. And by 2010, that 95% of transaction costs will have been eliminated. 3) Goldman Sachs, the US investment banker, predicts that once e-marketplaces are fully integrated into in-house IT systems, there will be cost savings, resulting in a 10% leap in productivity for metals.

More specifically the types of inefficiencies in the physical market, referred to by Emetra are:

- excess shipping where product swaps are under-utilized;
- excess shipping to sub-optimal customers (i.e. strategic relationships, lack of visibility of options, "know-how" barriers to trade);
- high transaction costs;
- high merchant margins in matching buyers and sellers, managing country and counter-party risk, and managing complex logistics;
- high interaction costs.

Regarding its advance into the derivative e-marketplace, Emetra has proposed the following value-added:

- tighter spreads through improved visibility leading to better matching of buyers and sellers;
- lower fees and commissions for clients;
- greater visibility of transactable bids/offers and market information for all participants;
- instantaneous access for global participants leading to improved liquidity;
- real-time accurate audit trail for participants and regulators;
- no errors due to human miscommunication with automatic matching as well as straight-through processing.

Brief descriptions and characteristics of individual copper industry e-marketplaces are provided in Annex 2. A list of other metal sites (mainly steel oriented) based in Russia, India, Asia and Africa, is provided at the end.

The majority of sites are selling physical products. In the derivatives market, there appears there will be competition between LME², eNYMEX², and Emetra, as well as, newcomers probably just being announced.

The strength of the traditional exchange has been price discovery, establishment of benchmark prices, and creation of a market in which to hedge risk. One of the questions with respect to viability of new exchanges competing with old, is whether they have the financial muscle to run an orderly marketplace. In other words, where will the liquidity providers want to trade? More exchanges could lead to more volatility, and therefore less efficiency. Also, commercial platforms in the metals field seem to have liquidity problems at this point. There is reluctance among potential users to pay fees to platform owners.

4.2 Buy end of Supply Chain

Quadrem, the new global mining procurement Internet venture, recently signed off (Sept/Oct. 2000) by its 16 founding shareholders, is expected to cost about \$100 m over next 2 years. Their aim is to reduce administration, cover 80% of transactions, with savings on procurement of items as varied as trucks, explosives and paperclips estimated at 5-10%, and reduce inventory costs. They expect to register over 3600 suppliers, who will use a common catalogue. The pilot operating start date is November 2000, with proposed full operation in first quarter of next year.

The 16 founding shareholders are Alcan, Alcoa, Anglo American, Barrick, BHP, Codelco, CVRD, De Beers, Inco, Morgan Stanley, Newmont, Noranda, Pechiney, Phelps Dodge, Rio Tinto and WMC. Others will be eventually allowed to participate, but the cost mechanism has yet to be established, e.g. public offering, charges.

4.3 Example: BHP presentation to IAP

BHP in its November 2000 presentation to ICSG's Industry Advisory Panel concluded the following in its opportunity review of e-marketplace impact on its metal business:

- our customers' buy hubs are our sell hubs
- new sources of liquidity and price transparency
- vendor managed inventories?
- the surest way to meet future standards is to set them.

It characterized itself as a producer, at the beginning of the value chain. It saw the need to stay closely linked by adding value to its customers (opportunity to establish a direct link), because otherwise it would have been giving up the relationship to intermediaries.

It will buy through Quadrem, and sell through E-Steel, and BHP Connect, its customer portal.

5. Summary

As stated at beginning of this paper, ICSG's objective in this info-circular has been to pool information together to assist its members better understand the changing copper industry supply chain infrastructure. Consultants have made the following predictions:

- potential \$800 m/year efficiency gains in global non-ferrous metal market
- 95% of transaction costs eliminated by 2010
- cost savings resulting in an eventual 10% productivity leap in the metal industry
- reallocation of market share, and margins between producers, warehouses and service centres.

The cost of automating procurement can be very high. Integration is risky, since the results and cost are never known until the end. How many transactions will it take to recoup the cost of implementing these systems? Technology also feeds itself, with never ending debugging and revision requirements, as well as hardware upgrades.

Consultants advise that the benefits of using e-commerce increase in direct proportion to the degree of integration between the customer and the marketplace. Will specific companies, therefore, suffer competitively if they do not integrate in-house, or with trading partners?

Metals and e-marketplaces are global, so automation of the supply chain will reach into many countries. How will countries like China that have their own market structures be affected?

One of the longer-term benefits anticipated from e-marketplaces is the collaboration efficiencies that will be created by joining producers to consumers - the continuous automated supply chain. Mines are at the beginning of the supply chain. How long will it take to connect to the consumers industry? What collaboration can we expect? Which inventories will be reduced as a result of the general e-marketplace "sell one/make one" target? Will all e-marketplaces eventually integrate together?

Glossary/Background

Commodity Futures Trading Commission (www.cftc.gov)

The US Commodity Futures Trading Commission (CFTC)'s mandate is to regulate commodity futures and option markets in the US. The agency protects market participants against manipulation, abusive trade practices and fraud. Through effective oversight and regulation, the CFTC enables the markets to serve better their important functions in the nation's economy -- providing a mechanism for price discovery and a means of offsetting price risk.

To ensure the financial and market integrity of the US futures markets, the CFTC reviews the terms and conditions of proposed futures and option contracts. Before an exchange is permitted to trade a futures and option contract in a specific commodity, it must demonstrate that the contract reflects the normal market flow and commercial trading practices in the actual commodity. The Commission conducts daily market surveillance and can, in an emergency, order an exchange to take specific action or to restore orderliness in any futures contract that is being traded.

The Office of International Affairs (part of CFTC) is the focal point for the Commission's global regulatory coordination efforts.

Databases

Companies turning to e-commerce, require more electronic storage of data, as they start to place their entire product catalogs and procurement systems online for customers and suppliers.

Digital Signatures

On July 25, 2000 electronic signatures became binding under UK law, just a few weeks after a bill was passed in the US (binding date: October 1, 2000). In Dec. 1999, Brussels passed a directive requiring European Union states to endorse the technology by summer 2001.

There are three steps to a secure electronic transaction:

1. The identity of both parties must be established and authenticated.
2. An encrypted message carrying the transaction request must be sent.
3. Completion of the transaction should be acknowledged.

Electronic Payment

As part of its e-commerce services, Deutsche Bank intends to offer clearing and settlement transactions, including such services as authentication, fee collection, payment, foreign exchange, trade finance and risk management.

Encryption

Rijndael (pronounced Rhine doll) was announced by the US Government in late October 2000 as the replacement to the current DES (data encryption standard) standard used by the US since 1977. They intend to use it to protect their top-secret documents for the next 30 years.

The new standard uses a key 128 bits long, instead of the 56 bits used by DES. A mathematician at the US National Institute of Standards and Technology has calculated that a machine capable of breaking DES would take 149 trillion years to break Rijndael. The new standard is expected to have a big influence on e-commerce. The algorithm will be freely available.

Futures Contract

A futures contract is an agreement to buy or sell in the future a specific quantity of a commodity at a specific price.

Hedgers and Speculators

Most participants in the futures and option markets are commercial or institutional users of the commodities they trade. These users, most of whom are called "hedgers", want the value of their assets to increase and also want to limit, if possible, any loss in value. Hedgers may use the commodity markets to take a position that will reduce the risk of financial loss in their assets due to a change in price. Other participants are "speculators" who hope to profit from changes in the price of the futures or option contract.

Lifecycle in use of Internet for business

The standard evolution in a company's use of the Internet for business is: creating a website → buying and selling over the web → buying/selling and information sharing → value creation across company boundaries by dynamically connecting people and applications in all aspects of business.

Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) software has been used by some companies to pool the information from the supply of raw materials, production lines and financial control together, to allow better control and visibility of transaction and processes, and therefore better management.

Unfortunately it is not sufficient to buy the software. The traditional business processes must often be reengineered to match the software. Furthermore since 80% of companies cannot compute the total cost of ownership for their ERP solutions, consultants advise to put together key performance indicators and track them.

SAP (German-based) has a 42% share of worldwide ERP revenue. It is followed by ORACLE (US-based) which has a 27% share.

Securities and Exchange Commission (www.sec.gov)

The mission of the US Securities and Exchange Commission (SEC) is to protect investors and maintain the integrity of the securities markets. Its Division of Market Regulation establishes and maintains standards for fair, orderly and efficient markets. Its Office of International Affairs works extensively in the international arena to promote cooperation, assistance, and to encourage the adoption of high regulatory standards worldwide.

Securities and Futures Authority Limited (www.sfa.org.uk)

The UK Securities and Futures Authority (SFA) regulates firms involved in the securities and futures sectors of the financial services industry. Its aim is to ensure investors can have some confidence that firms it regulates are safe to do business with. It tests that the firms deal honestly and fairly with investors, and have sound finances and management.

It is accountable to the Financial Services Authority that was established to oversee the implementation of the Financial Services Act. The Financial Services Act requires investment businesses to be authorized.

SFA regulated firms are involved in dealing or advising in securities or derivatives. The encompasses shares, bonds, traded options, corporate finance, financial futures and commodities futures on metals, oil, cereals, coffee and others.

Software Development Lifecycle

The software development lifecycle is:

Key Performance Indicator Target Setting → Plan Solution and Rapid Prototyping → Develop and Test → User Acceptance Testing → Deployment and Monitoring → Improvement and New Versions.

Supply Chain

The traditional supply chain covers the processes from buying raw materials from suppliers through to selling to customers. It typically includes the following activities: planning → sourcing → requests for quote (RFQ) → negotiate and award contract → ship and receive → payment → inventory → disposal/manufacture → sell. Over the last decade the focus has been to integrate systems across the trading partners in the chain to provide the visibility that

will allow everyone to focus on the end client, and gain the competitive benefits of sell one/make-one, be it inventory reduction or customization, etc.

XML and XML schematas

XML (Extensible Mark-up Language) is related to HTML (Htext Markup Language), the language in which web pages are written. HTML is code used to tag (mark) text to describe paragraph breaks, titles, and so on, to enable the computer to format the text for the reader. However, while HTML enhances the look of HTML documents, it does nothing to help with the interpretation of the content. XML is a data exchange standard. It works by linking text to "tags" that describe a document's content and meaning. For example, a tag for "price" attached to the relevant text, would be interpreted by the computer as the price, and rendered meaningful to computers everywhere. Several industries are working on their own lexicons, known as XML schemata, which will govern the use of particular terms in their industry. For example the steel industry has invented SML, steel mark-up language, a variation of XML.

Some believe that the metals industry B2B marketplaces are creating their own fragmentation and inefficiency by spawning a number of different standards initiatives to describe their products. Specifically E-Steel is developing SML (steel markup language), which is based on the extensible markup language (XML¹), E-Steel has developed Metal-XML, and Emetra uses existing Bolero.net standards.

Annex 2

Description of Individual Copper Industry e-Marketplaces

(note: internet sites are preceded by www)

CopperNet.com

Sale and purchase of copper goods.

Relaunched: September 2000

Copper-online.com

Launched in October 2000 by the NA Group (Norddeutsche Affinerie and Hüttenwerke Kayser) copper-online.com is a comprehensive system that allows the sale of copper scrap as well as purchases of copper products (cathodes, cast, rod, etc.). The site provides for interactive exchange of contract administration data and is designed to be linked directly to IT systems of NA and HK's trading partners. Copper-online is designed to attract other copper industry companies to put their business on the system. The objective is to extend copper-online.com to be a transaction gate of the major European industrial players in the copper industry.

eCopper.com

Its focus will be on raw materials (concentrate and scrap), refined metals, shapes (e.g. rod) and selected fabricated products. eCopper.com focuses exclusively on serving the copper industry. ECopper.com identifies itself as an independent and neutral commercial platform.. It has plans to expand into all major product market segments, equipment and services.

Launch Schedule: summer to fall 2000

Emetra.com

Emetra will provide a fully neutral and unbiased platform for selling and buying of physical metal, and metal derivatives.

Launch Schedule: Physical market - July 2000
 Phase 1: Primary metal
 Phase 2: Concentrates/Ores; Scrap Metal
 Phase 3: Downstream products
 Derivative market - December 2000

Services: Physical Market - logistics/shipping, finance/credit, insurance, trade facilitation (e-documents such as e bills of lading and e releases), hedging

Partners: Internet Capital Group, Safeguard International, MG plc. (25% stake), Deutsche Borse

EnronOnline.com

During 2000 Enron purchased MG plc., and LME ring dealing firm Rudolf Wolff.

Enron's non-metal website was launched November 1999. In July 2000, EnronOnline launched three physical metals contracts for US buyers and sellers: US Midwest aluminum, US copper high-grade warehouse, and US copper bonded warehouse.

Comment by John Sherriff, President and CEO of Enron: EnronOnline and Emetra will co-exist and occasionally compete. Wherever the customer sees the best price is where he will trade.

eNYMEX/COMEX (nymex.com)

The eNYMEX scheduled launch is the first six months of 2001.

It will be a global exchange for forward trading and clearing contracts in a range of physical commodities with an initial focus on energy and then metals.

May 2000 comments from John Moore, Chairman of COMEX:

Nymex has had an online overnight trading system for futures contracts since 1995. However it did not attract the volume that some people envisaged. To us the open outcry method of exchanging metals is the most efficient way - an open auction with many participants buying and selling at the same time and with prices being reported instantly.

October 2000 comments from late Patrick Thompson, president of NYMEX:

While the proprietary, principal-to-principal OTC trading systems announced so far will necessarily provide greater transparency and efficiency than the telephone-based markets they are meant to compete with or replace, they will suffer from some of the same limitations of those markets. In particular: counter-party credit risk exposures that limit liquidity without reducing financial risk, separate collateral requirements between OTC and exchange-traded positions that increase the cost of doing business, and separate order entry and trade confirmation between the futures and off-exchange markets.

eNYMEX will reduce or do away with these limitations and risks, and introduce for the first time complete counter-party risk management for OTC trading.

LME (lme.co.uk)

June 2000 comments by David King, CEO:

We plan to structure a screen-based trading medium to complement the ring after hours. Which does not mean that the ring will disappear, because we have made it clear that this forum will exist for as long as our members and market makers want it to exist.

MBM October 2000: The exchange appointed Sweden's OM Technology to develop a screen based trading system, which it expects to be in place by the end of 2000.

MaterialNet.com

Covers buying and selling of following metals:

carbon steel, stainless stain, tool steel and alloy steel,
aluminum, brass and copper, nickel, titanium and magnesium,
tungsten and tantalum, molybdenum, iron and lead.

Launch Schedule: third quarter 1999

Functionality: Auction

News June 2000 - Developing partnerships with several freight companies and intends to set up an "auction upon auction" scenario, which will allow the buyer to trigger a delivery auction directly after the purchase.

MetalSpectrum.com

Covers buying and selling of following metals:

Aluminum, stainless, copper, brass, nickel, titanium, scrap

Functionality: Auction, Catalog, Purchasing of MRO, new/used capital expenditure (equipment)

Services: industry information, credit checks, transaction, certification, logistics and financial support

Platform: Ariba/i2

Formed May 2000 by Alcoa, Reynolds, Kaiser, Thyssen Inc., Allegheny Technologies, North American Stainless, Olin Corp (copper alloy producer), and Vincent Metal Goods (metals distributor)

MITS

Owned by MG plc., one of the largest non-ferrous metals merchants. "MITS" stands for Metallgesellschaft Internet Trading System". It allows MG customers to directly trade LME futures with MG as a counter-party via the Internet.

Quadrem

Quadrem, the new global mining procurement Internet venture, recently signed off (Sept/Oct. 2000) by its 16 founding shareholders, is expected to cost about \$100 m over next 2 years. Their aim is to reduce administration, cover 80% of transactions, with savings on procurement of items as varied as trucks, explosives and paperclips estimated at 5-10%, and reduce inventory costs. They expect to sign up over 3600 suppliers, who will use a common catalogue. The pilot program will start operating in November 2000, and should be fully operational in first quarter of next year

The 16 founding shareholders are Alcan, Alcoa, Anglo American, Barrick, BHP, Codelco, CVRD, De Beers, Inco, Morgan Stanley, Newmont, Noranda, Pechiney, Phelps Dodge, Rio Tinto and WMC. Others will be eventually allowed to participate, but the cost mechanism has yet to be established, e.g. public offering, charges.

Spectronmetals.com

The company's aim is not to threaten the LME, but rather to provide its brokers with an additional tool.

June 2000 comment: The UK-based brokerage, Spectron Special Metal, launched into cobalt, molybdenum, vanadium, silicon, with a plan to add a new minor metal and one base metal every month.

Steelscreen.com

Its goal is to become the leading marketplace for metal products in Europe. Site launched spring 2000.

Other metal sites: Russia, India, Asia, Africa

Chinasteel.com.cn*	asia-steel.com (Hong Kong)
clickforsteel.com (India)	isteelasia.com (Hong Kong)
livesteel.com (Japan)	rawmart.com (Hong Kong)
Rusmet.com (Russia*)	steelmarket.co.za (S.Africa)
SteelnMetal.com (S. Kor)	WorldMetal.com (Hong Kong)

- not trading as of mid-November 2000

Sources

Metal Bulletin (June 2000)

Metal Bulletin Monthly Supplement on LME (October 2000)

International Wrought Copper Council - The Future of Terminal Markets Panel Discussion,
May 2000

BHP presentations

Emetra presentations

eCommerce and the Copper Industry Conference, sponsored by the Copper Development
Association (August 2000)

Financial Time

websites